

# River Instream FLOW Stewards

## Volunteer Manual



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# Safety

## Logistics

Be sure to let someone know where you are going, when you will return, and what to do if you don't return on time. If possible, work in pairs.

## Traffic

Park your car off the road where it does not block traffic or create a hazard, but not on the sidewalk or private property.

## Weather

Listen to weather reports and be prepared. Do not sample in unsafe weather conditions or if it is unsafe to reach the sampling location. Be aware of high winds and slippery banks.

## Water safety

Volunteers should not need to enter the water to monitor staff gauges. If you cannot read the staff gage from the bank, use a pair of binoculars.

## First Aid

Keep a first aid kit in your car and be aware of potentially serious allergic reactions, such as those caused by bee stings or poison ivy. Check for ticks, which may carry Lyme disease, after each field visit.

## Emergencies

Write down the contact information for the nearest hospital or emergency services on the last page of this manual. If you have a cell phone, bring it with you to the sampling site or leave it in your car nearby.

# Field Checklist

- Field notebook
- Pen or pencil
- Binoculars (if needed)
- Camera
- Cell phone (optional) & emergency contact numbers

# Definitions

**Discharge (Q):** The volume of water moving down a stream or river per unit of time, commonly expressed as cubic feet per second (also called "streamflow"). Discharge is the product of the cross-sectional area of a stream (A) and the average water velocity (V).  $Q = V \cdot A$ .

**Rating curve:** A mathematical or graphical relationship between water depth (stage) and discharge.

**Staff gage:** A graduated stick permanently installed in a river to measure the relative depth of water at a single location.

**Stage:** Water depth at a specific location in the river, as measured by the staff gage or other instrument.

**Water level logger:** A transducer that measures and records water depth based on pressure.

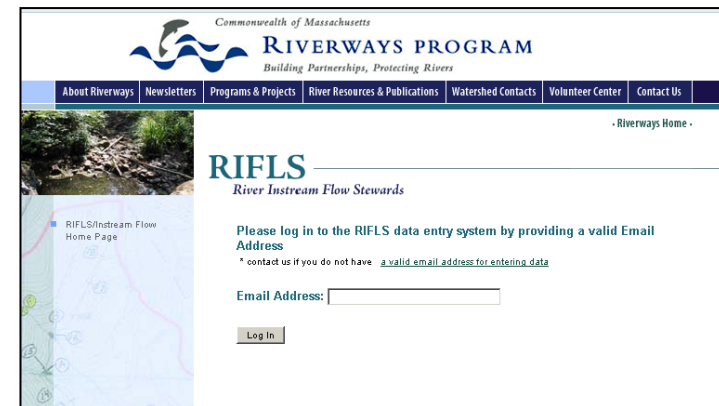
# How to read a staff gage

Our staff gages are marked in feet, tenths, and hundredths of feet. These units are the norm for much of the hydrologic work in the United States.

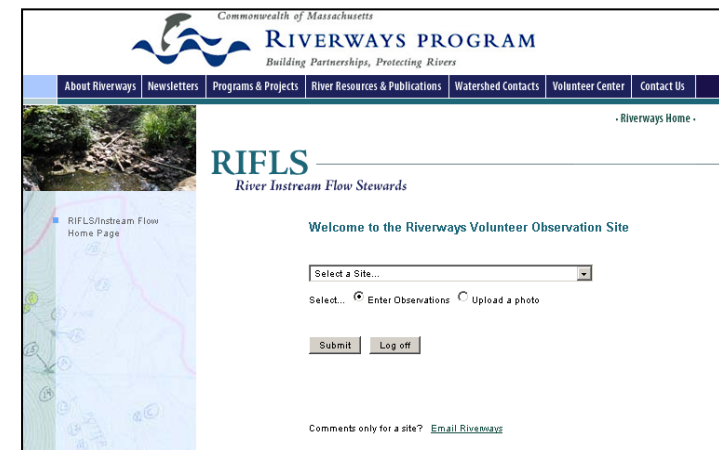
- Determine the water level to the nearest hundredth of a foot. The gages are labeled every two hundredths of a foot, so you will have to estimate when the water level is between two marks. If the water levels upstream and downstream of the staff gage differ, record the average.
- Record your observations in the same place every time (e.g., a notebook).
- Note the time and date of your reading.
- Note weather conditions or other relevant information.
- Take a photograph of the site from the same location at least 4 times per year to document different water levels, seasons, and/or unusual conditions or events.

# How to enter data

1. Go to [www.rifls.org](http://www.rifls.org); click the “Enter Data” link on the left.
2. On the next screen (see below), enter your e-mail address in the space provided and click “Log In.”

The screenshot shows the RIFLS (River Instream Flow Stewards) login page. At the top is the Commonwealth of Massachusetts logo and the text "RIVERWAYS PROGRAM Building Partnerships, Protecting Rivers". Below this is a navigation bar with links: "About Riverways", "Newsletters", "Programs & Projects", "River Resources & Publications", "Watershed Contacts", "Volunteer Center", and "Contact Us". The main content area features a large "RIFLS" logo and the text "River Instream Flow Stewards". Below the logo, it says "Please log in to the RIFLS data entry system by providing a valid Email Address". There is a text input field for "Email Address:" and a "Log In" button. A small map of Massachusetts is visible on the left side of the page.

3. Select your site (e.g. Chickley River, Chickley Road) from the “Select a Site...” drop-down box, select “Enter observations,” then click “Submit.”

The screenshot shows the RIFLS observation page. It has the same header and navigation bar as the login page. The main content area says "Welcome to the Riverways Volunteer Observation Site". Below this is a "Select a Site..." drop-down menu. There are two radio buttons: "Enter Observations" (which is selected) and "Upload a photo". Below these are "Submit" and "Log off" buttons. At the bottom, there is a link for "Comments only for a site? Email Riverways". A small map of Massachusetts is visible on the left side of the page.

4. Enter the date, time, and staff gage readings in the formats specified. In the “Comments” field, enter notes about changes at the site that may affect the rating curve, problems noticed, fish kills, rain events, water pollution, or any other field observations.

One to five days of data can be entered on a single page. If you have more data to enter, simply click the “Submit” button and return to the data entry form.

Please double check your data for typos before hitting the “Submit” button. If you realize you made an entry error after submitting data please email us the correct data (see page 13 for contact info).

Note, if you have your browser set at the largest text view, you may not be able to see and use all the fields. Try setting the text one size smaller.

# How to upload a photo

Digital photos can be uploaded to the website’s database.

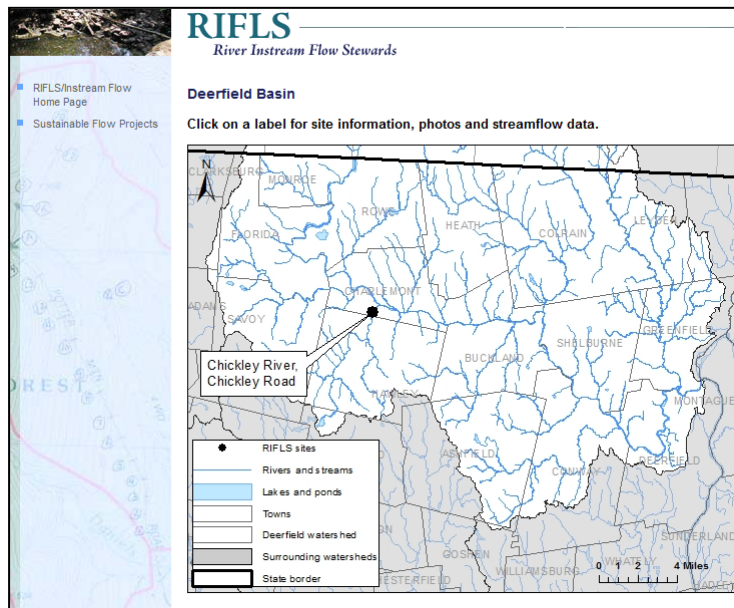
- Return to the site selection page (see page 5), choose your site, select “Upload a photo” and click “Submit.”
- Select the date and time that the photograph was taken. Either type in the date or use the calendar icon next to the date field to select the date.
- In the “Photo File Name” field, use the name of the river and a unique identifier (such as Chickley\_River\_flood).
- Enter a simple description of the photo you’ve chosen.
- Click “Browse” to open a window that allows you to search the folders on your hard drive or other storage device for the photo you want. Select the photo and click “Submit.”

Note, you can only upload one photo at a time.

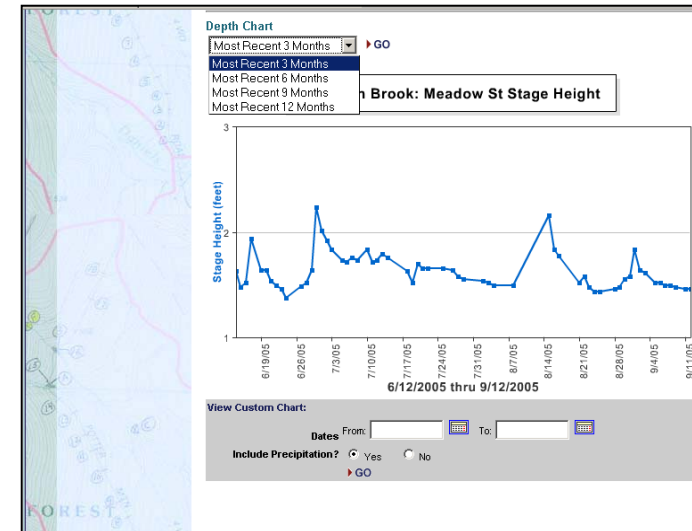
# How to view your data

The staff gage data that you have recorded and entered into the website is instantly available so that your observations and all past observations may be viewed.

Go to the RIFLS main page and click on the watershed map on the basin you're interested in. This will bring up a detailed map of the basin and the locations where staff gages are installed.

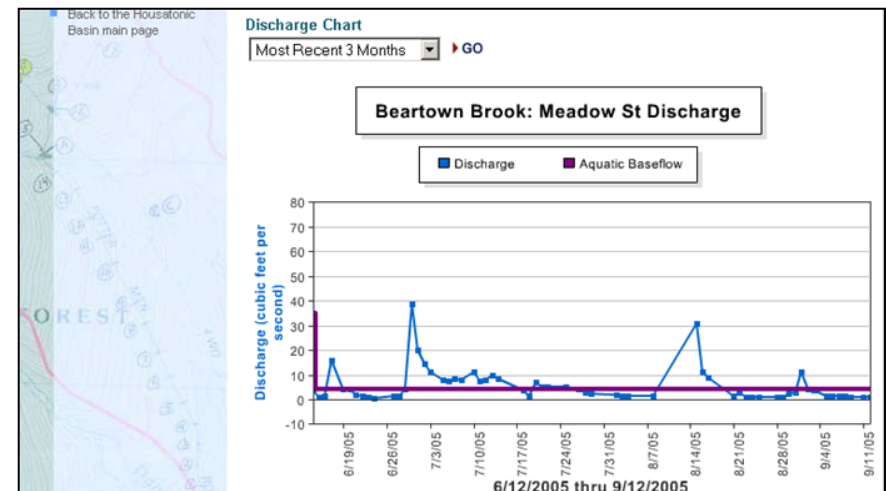


Click on any of the staff gage locations on the map. This opens a new page which shows a graph of the most recent 3 months of staff gage data. A drop-down menu at the top allows you to select a 3-, 6-, 9-, or 12-month period to be displayed as a graph. These pre-made graphs are automatically updated once a week. To see more recent data, select a "custom chart" (see next page).



In the box titled "View Custom Chart," select the dates by clicking on the calendar symbol, then click "Go."

Discharge (streamflow) data are displayed for sites where a rating curve has been established. Discharge charts can also be viewed in 3- to 12- month periods or as a custom chart.



# What's a rating curve?

Rivers are unique and dynamic systems. Each stream has a different shape and flow pattern. For a uniform structure such as a pipe or concrete culvert, flow velocity based on water depth is a straightforward calculation. For a river, its variability and shape must be taken into account when using depth to determine the volume of water flowing past a point in a given unit of time, (discharge).

A single discharge measurement is the product of the cross-sectional area of a stream — captured by 15 to 30 width, depth, and velocity measurements in a line across the stream (Figure 1) — and the average velocity measured at each point. Multiple measurements of discharge are made at different times and at different water levels throughout the year. These measurements, along with the staff gage readings, are used to create a rating curve (Figure 2).

By describing the relationship between stream depth and discharge at many flow levels, a rating curve accounts for the natural variability of rivers. This curve can be used as a guide to convert your stage readings from the staff gage into discharge (flow) estimates.

We build the rating curve into our websites' database, so once the rating curve is complete, all stage measurements you enter online will be instantly converted to streamflow.

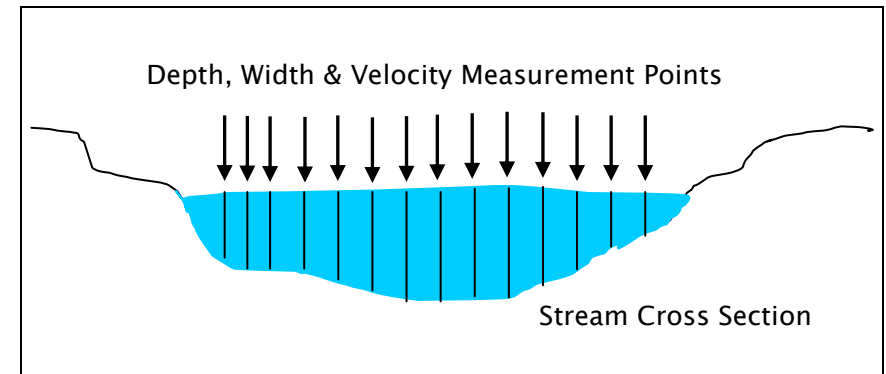


Figure 1. Discharge Measurement

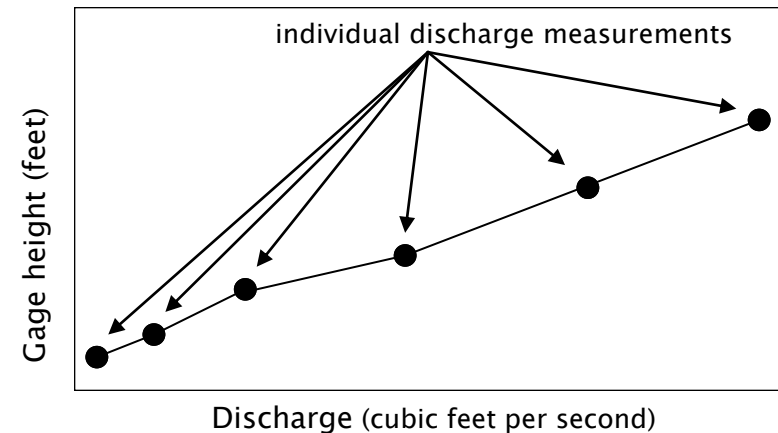


Figure 2. Rating Curve

## Keep your eyes out for...

- A beaver dam downstream that backs up water all the way to the staff gage
- Newly fallen trees, large debris, or excessive vegetation growth near the staff gage
- Extreme scour, erosion, or shifting sand bars near the gage
- Movement or vandalism of the staff gage
- Excessive leaf buildup at the downstream riffle
- Any other changes that you think might affect the rating curve

## Contact information

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